

REMARKS

In the present Amendment, claim 1 is amended to incorporate the subject matter of claim 11, which depends from claim 1, and to reincorporate subject matter deleted in the Amendment filed April 17, 2008. Accordingly, claim 11 is canceled. No new matter has been added.

Upon entry of the Amendment, Claims 1-4, 8, 20, 22, 27, 28 and 31-34 will be pending.

(A) In Paragraph Nos. 1 and 2 on page 2 of the Office Action, the Examiner responds to the arguments set forth in the Supplemental Rule 116 Response filed December 22, 2008.

Applicants respond follows:

(A-1) In Paragraph No. 1, the Examiner indicates that he was not persuaded by Applicants' arguments concerning Table 2 of U.S. Patent No. 4,218,306 (Gross). Specifically, the Examiner disregarded Applicants' arguments because, as per Table 2 of Gross, the process according to Gross produces liquefied petroleum gas (LPG) and, additionally, the present claims are not limited to the production of LPG.

However, Applicants clarify that they were not arguing that the process according to Gross would not produce any LPG. Instead, Applicants were pointing out to the Examiner that Gross fails to teach the effect on LPG yields corresponding to the injection point of the secondary feed. Instead, Table 2 simply demonstrates that the yield pattern varies with the type of feed used for the secondary feed.

In more detail, Gross expressly provides a "selective conversion desired to gasoline before contact in a more downstream portion of the riser with a higher coke producing feed." (Gross at 4:21-31 (emphasis added).) Thus, it should be clear that the main objective of Gross is the production of gasoline, e.g., a quench is provided (*see* Gross at 4:3-7), although lighter hydrocarbons may also be obtained. In contrast, the present claims require the downstream

injection of Feed B, after maximum LPG production from Feed A, at a higher temperature than that of Feed A, for purposes of maximizing LPG at the expense of gasoline.

Further, Gross discloses that charging the less desirable and generally higher coke producing hydrocarbon material (i.e., secondary feed) downstream in the riser conversion zone with little or no preheat may be used to lower the temperature of the feed-catalyst suspension. (See Gross at 3:68 to 4:3.) One of ordinary skill would understand that this section of Gross is discussing “quenching” in FCC technology. The quenching effect of the secondary feed would require more combustion air be sent to the regenerator, since coke production would increase as CTO (i.e., catalyst to oil ratio) also increases.

In contrast to the teaching of Gross, Tables 3A and 3B (case 7) set forth in the present application demonstrate that a higher temperature of the secondary feed increases conversion into LPG. Thus, the injection of secondary feed in the presently claimed invention is not directed to promoting quenching. Upon process conditions LPG production would increase without increasing CTO. The use of a secondary feed as a quenching stream would require more combustion air be sent to the regenerator, since the coke production would increase as CTO increases. Normally air constraints would limit the use of quenching.

Applicants already set forth the explanation in the above two paragraphs at page 6, lines 3-16, of the Supplement Response filed December 22, 2008. However, the Examiner has not addressed this explanation and distinction of Gross in the instant Office Action. Instead, the Examiner redirects attention to Table 2 of Gross where the only information presented is “Oil to Riser Temperature,” leading to a misinterpretation that both feeds are injected at the same temperature of 543 °F (283 °C).

If the two feeds were injected at the same temperature, the catalyst circulation would be kept the same. Nevertheless, if one follows Gross's teachings (*see* 3:68 to 4:3), the secondary feed would be injected in the riser at lower or no preheating (e.g., at a temperature from 90-150 °F), and therefore, the catalyst circulation must be higher in order to keep the reaction temperature constant. As a result, a greater quantity of coke will be generated by the greater catalyst circulation. Consequently, to keep the same coke combustion it would be necessary to increase the flow of combustion air, which is usually not possible in commercial units, which operate in most cases with a limited air flow, due to the blower capacity or the velocity limit in the catalyst regenerator. In view of the above, claim 1 is amended herein for clarification purposes to recite that the catalyst to oil ratio is maintained during the cracking of feeds A and B.

(A-2) With regard to Paragraph No. 2, Applicants thank the Examiner for withdrawing the finality of the previous Office Action and address the Examiner's new rejections below.

(B) In Paragraph No. 6 at pages 3-6 of the Office Action, claims 1-4, 8, 11, 20, 22, and 28 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over USPN 4,218,306 (Gross) in view of USPN (Adornato). In Paragraph No. 7 at pages 6-7 of the Office Action, claims 31-34 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Gross in view of Adornato and USPN 6,416,656 (Zhang).

Applicants respectfully traverse.

In addition to Applicants' Remarks in Section (A-1) above, Applicants point out to the Examiner that Adornato expressly addresses the disclosure of Gross and clearly teaches away from the Examiner's combination of Adornato with Gross.

The Examiner takes the position that Gross allegedly discloses a process that meets the limitations of present claim 1 except for the use of a dispersion steam, wherein the dispersion steam is present in Feed B in an amount from about 5 to 20 %.

Applicants further point out to the Examiner that, according to claim 1, Feed B, which is more refractory to cracking than Feed A, is injected at a point downstream of Feed A and at a temperature equal to or higher than the injection temperature of Feed A.

The Examiner applies Adornato in an attempt to cure the deficiency of Gross. In particular, the Examiner cites Adornato as disclosing that 5 wt % or more of dispersion steam could be added to the heavy feed to improve atomization. The Examiner takes the position that it “would have been obvious to one having ordinary skill in the art at the time the invention was made to add steam to the heavy feed as taught by Adornato, since Adornato states at column 1, lines 47-57 that such a modification would improve cracking efficiency and reduce hydrocarbon partial pressure.”

Applicants respectfully disagree.

In the section of Adornato cited by the Examiner, Adornato is discussing a “blended feed” approach, wherein a small amount of a heavier feed is blended with the distilled feed and this blended feed is injected to the base of the riser. (See Adornato at 1:26-32, describing blended and split feeds.) Adornato distinguishes the blended feed approach from the split feed approach, wherein different kinds of feeds are injected at different elevations in the riser. (The claimed process is a split feed approach.) Further, in discussing the deficiencies in cracking using the blended feed approach, Adornato discloses that conventional FCC units improve the process by using “relatively large amounts of atomizing steam.” (See Adornato at 1:47-49.) Thus, Adornato is disclosing that the steam is added at the base of the riser with the blended

feed. Therefore, the cited section of Adornato would not provide one of ordinary skill in the art with any reason to modify the process of Gross by adding steam because, as per Adornato itself, Gross teaches a split feed process. (*See* Adornato at 1:38-42.)

In addition, Adornato teaches away from using large amounts of atomization steam. An alleged *prima facie* case of obviousness may be rebutted by showing that the prior art teaches away from the claimed subject matter.¹ Moreover, an argument that the prior art teaches away from the claimed subject matter is generally most persuasive when the prior art criticizes, discredits, or otherwise discourages the claimed subject matter.² Here, Adornato itself criticizes, discredits, or otherwise discourages the use of increased amounts of atomization steam, expressly disclosing that “it substantially increases the load on the main column, and limits primary feed throughput.” (*See* Adornato at 1:54-56.) Likewise, Adornato points out deficiencies of split feeds and quenching. (*See* Adornato at 1:47 to 2:6.)

Moreover, since the section of Adornato discussing dispersion steam is only referring to a blended process, as opposed to a split feed process, Adornato provides one of ordinary skill in the art with no particular reason for adding the dispersion steam to the secondary feed in a split feed process. At the least, that section of Adornato does not expressly disclose where the dispersion steam is injected. In contrast, the claimed process requires that the secondary feed, which is more refractory to cracking than the primary feed, be accompanied by 5 to 20 % of dispersion steam. Put another way, even if the references were combined, the combination fails to teach each element of present claim 1.

¹ *See In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997).

² *See In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Applicants further submit that Gross, as well as Adornato, teaches a FCC process applying a quench in order to lower the temperature in the riser. In contrast, the presently claimed invention uses dispersion steam at a temperature equal to or higher than the injection temperature of feed A.

In view of the above, reconsideration and withdrawal of the Section 103 obviousness rejection of the present claims based on Gross, Adornato and Zhang are respectfully requested.

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the local, Washington, D.C., telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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